

WHAT IS CLAIMED IS:

1. A method of analyzing a concentration of a target substance contained in a gas, comprising the steps of:
  - 5 (a) providing a quartz oscillator having opposing surfaces each provided with an electrode, at least one of said electrodes being reactable with said target substance;
  - (b) contacting said gas with said reactable electrode of said quartz oscillator so that the target substance is reacted with said reactable electrode; and
  - 10 (c) measuring a variation in frequency of said quartz oscillator in step (b).
- 15 2. A method of analyzing a concentration of a target substance contained in a gas, comprising the steps of:
  - (a) feeding said gas to a reactor to decompose said target substance and to produce a product gas containing a decomposition product;
  - 20 (b) discharging said decomposition product gas from said reactor;
  - (c) providing a quartz oscillator having opposing surfaces each provided with an electrode, at least one of said electrodes being reactable with said decomposition product;
  - 25 (d) contacting said discharged decomposition product gas from step (b) with said reactable electrode of said quartz oscillator so that said decomposition product is reacted with said reactable electrode; and
  - 30 (e) measuring a variation in frequency of said quartz oscillator in step (d).
- 35 3. A method as claimed in claim 2, wherein said target substance is an oxidizable substance selected from the group consisting of an aromatic compound, an aliphatic

hydrocarbon, acetylene and an inorganic gas, wherein step  
5 (a) comprises oxidizing said oxidizable substance with  
iodine pentoxide and an oxidizing agent selected from the  
group consisting of sulfuric acid and pyrosulfuric acid to  
produce iodine as said decomposition product, and wherein  
said reactable electrode is made of silver.

4. A method as claimed in claim 2, wherein said target  
substance is a volatile chloroorganic compound, wherein  
10 step (a) comprises oxidizing said chloroorganic compound  
with lead oxide and sulfuric acid to produce hydrogen  
chloride as said decomposition product, and wherein said  
reactable electrode is made of copper.

15 5. An apparatus for analyzing a concentration of a  
target substance contained in a gas, comprising:

a reactor configured to receive said gas and to  
decompose said target substance, thereby producing a  
product gas containing a decomposition product;

20 a contacting chamber;

a connecting passage extending between said reactor  
and said contacting chamber for discharging the product  
gas from said reactor and introducing same to said  
contacting chamber;

25 a quartz oscillator disposed in said contacting  
chamber and having opposing surfaces each provided with an  
electrode, at least one of said electrodes being reactable  
with said decomposition product so that said decomposition  
product is reacted with said reactable electrode when  
30 said product gas is contacted with said reactable  
electrode; and

a device for measuring a frequency of said quartz  
oscillator.

35 6. An apparatus as claimed in claim 5, wherein said

reactor is provided with a packed bed of an oxidizing agent supported on carrier particles, said oxidizing agent being reactable with said target substance to yield said decomposition product.

5

7. An apparatus as claimed in claim 6, wherein said carrier particles are silica particles, and wherein said oxidizing agent is selected from a first combination of iodine pentoxide with sulfuric acid or pyrosulfuric acid,
- 10 and a second combination of lead oxide with sulfuric acid, provided that said reactable electrode is silver when said oxidizing agent is said first combination and that said reactable electrode is copper when said oxidizing agent is said second combination.

15